Naval Education and Training Command

NAVEDTRA 82014
May 1994
0503-LP-479-3700

Nonresident Training Course (NRTC)

Blueprint Reading and Sketching

Only one answer sheet is included in the NRTC. Reproduce the required number of sheets you need or get answer sheets from your ESO or designated officer.

0503LP4793700

COMMANDING OFFICER
NETPDTC
6490 SAUFLEY FIELD RD
PENSACOLA, FL 32509-5237

ERRATA #1
Stock Ordering No.
0503-LP-479-3701

19 Oct 1998

Specific Instructions and Errata for
Nonresident Training Course

BLUEPRINT READING AND SKETCHING, NAVEDTRA 82014

1. No attempt has been made to issue corrections for errors in typing, punctuation, etc., that do not affect your ability to answer the question or questions.

2. To receive credit for deleted questions, show this errata to your local course administrator (ESO/scorer). The local course administrator is directed to correct the course and the answer key by indicating the question deleted.

3. Assignment Booklet, NAVEDTRA 82014

Delete the following questions, and leave the corresponding spaces blank on the answer sheets:

Questions

1-21
1-22
2-48
3-28
4-21
4-34
4-62

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BLUEPRINT READING AND SKETCHING

NAVEDTRA 82014

Prepared by the Naval Education and Training Program Management
Support Activity, Pensacola. Florida

Congratulations! By enrolling in this course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the total Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program. You have taken an important step in self-improvement. Keep up the good work.

HOW TO COMPLETE THIS COURSE SUCCESSFULLY

ERRATA: If an errata comes with this course, make all indicated changes or corrections before you start any assignment. Do not change or correct the Training Manual (TRAMAN) or assignments in any other way.

TEXTBOOK ASSIGNMENTS: The TRAMAN for this course is *BLUEPRINT READING AND SKETCHING,* NAVEDTRA 12014. The TRAMAN pages that you are to study are listed at the beginning of each assignment. Study these pages carefully before attempting to answer the questions in the course. Pay close attention to tables and illustrations because they contain information that will help you understand the text. Read the learning objectives provided at the beginning of each chapter or topic in the text and/or preceding each set of questions in the course. Learning objectives state what you should be able to do after studying the material. Answering the questions correctly helps you accomplish the objectives.

BLACK DOT INFORMATION: Black dots (●) may be used in the text and correspondence course to emphasize important or supplemental information and to highlight instructions for answering certain questions. Read these black dot entries carefully; they will help you answer the questions and understand the material.

SELECTING YOUR ANSWERS: After studying the TRAMAN, you should be ready to answer the questions in the assignment. Read each question carefully, then select the BEST answer. Be sure to select your answer from the subject matter in the TRAMAN. You may refer freely to the TRAMAN and seek advice and information from others on problems that may arise in the course. However, the answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the same course. Failure to follow these rules can result in suspension from the course and disciplinary action.

SUBMITTING COMPLETED ANSWER SHEETS: Complete all assignments as quickly as possible to derive maximum benefit from the course. As a minimum, you must submit at least one assignment per month. This is a requirement established by the Chief of Naval Education and Training. Failure to meet this requirement could result in disenrollment from the course.

TYPES OF ANSWER SHEETS: If you are a U.S. Navy enlisted member on active duty or a drilling U.S. Naval Reserve enlisted member, you should use the answer sheet attached at the end of this course and follow the instructions in section A below. If you are an enlisted U.S. Naval Reserve member who is not attached to a drilling unit or if you are an officer, a civilian, or a member of the U.S. Army, Air Force, Marine Corps, or Coast Guard, you should use the Automatic Data Processing (ADP) answer sheets included in the course package and follow the instructions in section B.

A. Manually Scored Answer Sheets

If you are a U.S. Navy enlisted member on active duty or attached to a U.S. Naval Reserve drilling unit, your course will be administered by your local command. You must use the answer sheet designed for

manual scoring, NETPMSA form 1430/5, Stock Ordering Number 0502-LP-216-0100. You may get a supply of the forms from your Educational Services Officer (ESO), or you may reproduce the one in the back of this course booklet. DO NOT USE THIS FORM FOR COURSES ADMINISTERED BY NETPMSA.

Recording Information on the Manually Scored Answer Sheets: As you complete each assignment, submit the completed answer sheet to your ESO for grading. You may submit more than one answer sheet at a time. Remember, you must submit at least one assignment each month.

Grading: Your ESO will grade each answer sheet and notify you of any incorrect answers. The passing score for each assignment is 3.2. If you receive less than 3.2 on any assignment, the ESO will list the questions you answered incorrectly and give you an answer sheet marked "RESUBMIT." You must redo the assignment and complete the RESUBMIT answer sheet. The maximum score you can receive for a resubmitted assignment is 3.2.

Course Completion: After you have submitted all the answer sheets and have earned at least 3.2 on each assignment, your command should give you credit for this course by making the appropriate entry in your service record.

Student Qestions: If you have questions concerning the administration of this course, consult your ESO.

B. ADP Answer Sheets

If you are an enlisted U.S. Naval Reserve member who is not attached to a drilling reserve unit or if you are an officer, a civilian, or a member of the U.S. Army. Air Force, Marine Corps, or Coast Guard, use the ADP answer sheets provided in your course package. You should use one blank original ADP answer sheet for each assignment. Use only the original ADP answer sheet provided in your course package; NETPMSA will not accept reproductions.

Recording Information on the ADP Answer Sheets: Follow the "MARKING INSTRUCTIONS" on each answer sheet. Be sure that blocks 1, 2, and 3 are filled in correctly. This information is necessary for your course to be properly processed and for you to receive credit for your work.

As you work the course, be sure to mark your answers in the course booklet because your answer sheets will not be returned to you. When you have completed an assignment. transfer your answer from the course booklet to the answer sheet.

Mailing the Completed ADP Answer Sheets: Upon completing an assignment, mail the completed answer sheet to:

COMMANDING OFFICER
NETPMSA CODE 074
6490 SAUFLEY FIELD RD
PENSACOLA FL 32559-5000

Use envelopes to mail your answer sheets. You must provide your own envelopes or request them from your ESO. You may enclose more than one answer sheet in a single envelope. Remember, regardless of how many answer sheets you submit at a time, NETPMSA should receive at least one assignment a month.

NOTE: DO NOT USE THE COURSE COMMENTS PAGE AS AN ENVELOPE FOR RETURNING ANSWER SHEETS OR OTHER,RCOURSEMATERIALS.

Grading: NETPMSA will grade the answer sheets and notify you by letter concerning your grade for each assignment, your incorrect answers, and your final grade. The passing score for each assignment is 3.2. If you receive less than 3.2 on any assignment, you must rework the assignment. NETPMSA will enclose a new ADP answer sheet in the letter notifying you of the questions you answered incorrectly. You will be required to redo the assignment and resubmit the new answer sheet. The maximum score you can receive for a resubmitted assignment is 3.2.

Course Completion: When you complete the last assignment, fill out the "Course Completion" form in the back of the course and enclose it with your last answer sheet. NETPMSA will issue you a letter certifying that you satisfactorily completed the course. You should make sure that credit for the course is recorded in your service record. YOU MAY RETAIN THE TEXT.

NOTE: YOUR OFFICIAL COURSE COMPLETION DATE WILL BE THE DATE YOUR LAST ASSIGNMENT IS PROCESSED THROUGH THE NETPMSA ADP SYSTEM--NOT THE DATE YOU DEPOSIT THE LAST ASSIGNMENT IN THE MAIL. This is especially important if you are taking the course for Naval Reserve retirement credit. You must mail your answer sheets at least 60 days before your anniversary date. This will provide you with enough time for delays in the mail or reworking failed assignments. DO NOT MAIL YOUR ASSIGNMENTS TO THE NAVAL RESERVE PERSONNEL COMMAND (NRPC).

Student Questions: Refer questions concerning this course to NETPMSA by mail (use the address on page ii) or by telephone: DSN 922-1366 or commercial (904) 452-1366.

NAVAL RESERVE RETIREMENT CREDIT

If you are a member of the Naval Reserve, you will receive retirement points if you are authorized to receive them under current directives governing retirement of Naval Reserve personnel. For the purpose of Naval Reserve retirement, this edition of the course is evaluated at 6 points. These points will be credited to you upon your satisfactory completion of the entire course.

NOTE: YOUR OFFICIAL COURSE COMPLETION DATE WILL BE THE DATE YOUR LAST ASSIGNMENT IS PROCESSED THROUGH THE NETPMSA ADP SYSTEM--NOT THE DATE YOU DEPOSIT THE LAST ASSIGNMENT IN THE MAIL. Refer to the Course Completion paragraph under section B. ADP Answer Sheets.

COURSE OBJECTIVES

Upon completion of this course, you should understand the basics of blueprint reading including projections and views, technical sketching, and the use of blueprints in the construction of machines, piping, electrical and electronic systems, architecture, structural steel, and sheet metal.

Naval courses may include several types of questions—multiple-choice, true-false, matching, etc. The questions are not grouped by type but by subject matter. They are presented in the same general sequence as the textbook material upon which they are based. This presentation is designed to preserve continuity of thought, permitting step-by-step development of ideas. Not all courses use all of the types of questions available. The student can readily identify the type of each question, and the action required, by inspection of the samples given below.

MULTIPLE-CHOICE QUESTIONS

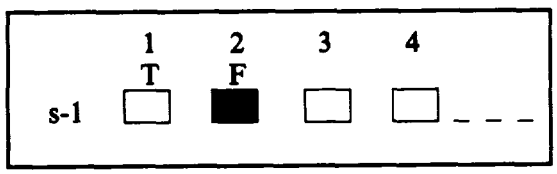
Each question contains several alternatives, one of which provides the best answer to the question. Select the best alternative, and blacken the appropriate box on the answer sheet.

SAMPLE

s-1. Who was the first person appointed Secretary of Defense under the National Security Act of 1947?

1. George Marshall
2. James Forrestal
3. Chester Nimitz
4. William Halsey

Indicate in this way on the answer sheet:



TRUE-FALSE QUESTIONS

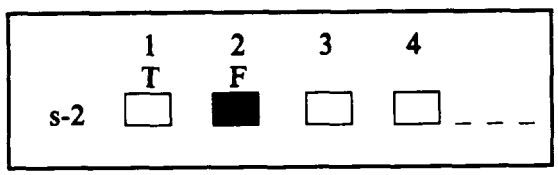
Mark each statement true or false as indicated below. If any part of the statement is false the statement is to be considered false. Make the decision, and blacken the appropriate box on the answer sheet.

SAMPLE

s-2. All naval officers are authorized to correspond officially with any systems command of the Department of the Navy without their respective commanding officer's endorsement.

1. True
2. False

Indicate in this way on the answer sheet:



MATCHING QUESTIONS

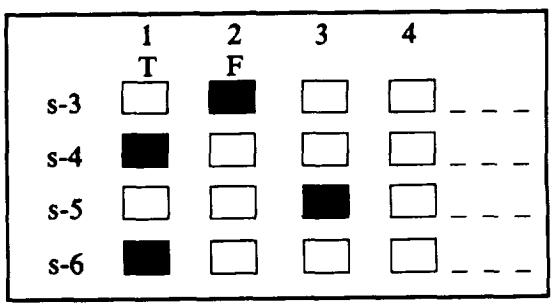
Each set of questions consists of two columns, each listing words, phrases or sentences. The task is to select the item in column B which is the best match for the item in column A that is being considered. Items in column B may be used once, more than once, or not at all. Specific instructions are given with each set of questions. Select the numbers identifying the answers and blacken the appropriate boxes on the answer sheet.

SAMPLE

In questions s-3 through s-6, match the name of the shipboard officer in column A by selecting from column B the name of the department in which the officer functions. Some responses may be used once, more than once, or not at all.

A. OFFICER	B. DEPARTMENT
s-3. Damage Control Assistant	1. Operations Department
s-4. CIC Officer	2. Engineering Department
s-5. Disbursing Officer	3. Supply Department
s-6. Communications Officer	

Indicate in this way on the answer sheet:



ASSIGNMENT 1

Textbook Assignment: "Blueprint Reading," "Technical Sketching," and Projections and Views," chapters 1 through 3.

1-1. Which of the following statements best describes the term "blueprint reading"?

1. Interpreting the ideas expressed by the engineer or craftsman
2. Transferring the blueprint to the part to be made
3. Understanding the symbols used to prepare blueprints
4. Reproducing the print with a microprocessor

1-2. The standards and procedures prescribed by military and American National standards are published in which of the following publications on 31 July of each year?

1. Military Standards (MIL-STD)
2. Department of Defence Index of Specifications and Standards
3. American National Standards Institute (ANSI)
4. MIL-STD and ANSI standards

1-3. To find the correct drawing symbols to show fittings and electrical wiring on ships, you should refer to what standards?

1. ANSI Y32.9 and MIL-STD-100A
2. MIL-STD-15 and MIL-STD-25A
3. MIL-STD-17B and ANSI 46.1-1962
4. ANSI Y31.2 and MIL-STD-22A

1-4. What is the primary difference in the various methods of producing blueprints?

1. The type of paper used
2. The color and transparency of the paper
3. The type of plotter used
4. The type of paper and the processes used

A. Information block
B. Title block
C. Revision block
D. Scale block
E. Bill of material
F. Application block

Figure 1A

IN ANSWERING QUESTIONS 1-5 THROUGH 1-10, REFER TO THE PARTS OF A BLUEPRINT IN FIGURE 1A.

1-5. This block is used when a change has been made to the drawing.

1. A
2. B
3. C
4. D

1-6 This block includes information required to identify the part, name, and address of the organization that prepared the drawing.

1. A
2. B
3. C
4. D

1-7 This block gives the reader additional information about material, specifications and so on, to manufacture the part.

1. A
2. B
3. C
4. D

1-8. This block shows the size of the drawing compared to the actual size of the part.

1. B
2. C
3. D
4. E

1-9. This block contains a list of the parts and/or material needed for the project.

1. C
2. D
3. E
4. F

1-10. This block identifies directly or by reference the larger unit that contains the part or assembly.

1. C
2. D
3. E
4. F

1-11 Which of the following information provides contractors, supervisors, and manufacturers with more information than is shown graphically on a blueprint?

1. Finish marks
2. Station numbers
3. Notes and specifications
4. Zone numbers

IN ANSWERING QUESTIONS 1-12 THROUGH 1-14, SELECT FROM THE FOLLOWING LIST THE TYPE OF NUMBER YOU SHOULD USE FOR THE PURPOSE DESCRIBED IN THE QUESTION.

A. Drawing number
B. Reference number
C. Station number
D. Zone number

1-12. Evenly spaced numbers on a drawing that begin with zero and number outward in one or both directions.

1. A
2. B
3. C
4. D

1-13. Numbers placed to help locate a point or part on a drawing.

1. A
2. B
3. C
4. D

1-14. Numbers that refer to the numbers of other blueprints.

1. A
2. B
3. C
4. D

1-15. In figure 1-2 in the text, the list of parts and symbols shown in the upper right corner is known by what term?

1. Legend
2. Symbol
3. Note
4. Specification

A.	Preliminary plan
B.	Contract plan
C.	Contract guidance plan
D.	Standard plan
E.	Type plan
F.	Working plan
G.	Corrected plan
H.	Onboard plan

Figure 1B

IN ANSWERING QUESTIONS 1-16 THROUGH 1-23, CHOOSE FROM FIGURE 1B THE TYPE OF PLAN DESCRIBED BY THE QUESTION.

1-16. The plan used by the contractor to construct the ship.

1. C
2. D
3. E
4. F

1-17. The plan used to illustrate design features of the ship subject to development.

1. C
2. D
3. E
4. F

1-18. The plan furnished by the ship builder that is needed to operate and maintain the ship.

1. E
2. F
3. G
4. H

1-19. The plan that illustrates the general arrangement of equipment or parts that do not require strict compliance to details.

1. E
2. F
3. G
4. H

1-20. The plan that illustrates the arrangement or details of equipment, systems, or parts where specific requirements are mandatory.

1. C
2. D
3. E
4. F

1-21. The plan submitted before the contract is awarded.

1. A
2. B
3. C
4. D

1-22. The plan that illustrates the mandatory design features of the ship.

1. A
2. B
3. C
4. D

1-23 The plan that has been corrected to illustrate the final ship and system arrangement, fabrication, and installation.

1. E
2. F
3. G
4. H

1-24. What publication contains the letters to be used to designate the size of a blueprint?

1. Naval Ships' Technical Manual
2. ANSI 27.2Y
3. MIL-STD 100
4. Consolidated Index of Drawing

1-25. In the current blueprint numbering plan, the activity that designed the object to be built is identified in which of the following positions?

1. Federal Supply Code Identification Number
2. System Command Number, Part 1
3. System Command Number, Part 2
4. Revision Letter

1-26. What is the major difference in the old and new shipboard numbering systems?

1. The federal supply code identification number
2. The serial and file number
3. The Naval Facilities Engineering Code Identification number
4. The group numbers in block two

1-27. Which of the following is a necessary practice in caring for blueprints?

1. Make all corrections in ink
2. Allow them to dry out completely before restoring them
3. Properly fold and file them
4. Be sure all erasures are complete

1-28. When a plan is revised, what is the disposition of the old plan?

1. It is retained in a special file
2. It is attached to the back of the new copy
3. It is removed and sent to Naval Archives
4. It is removed and destroyed when replaced by the revised plan

1-29. On most ships, personnel in which of the following areas maintain the ship plans?

1. Engineering logroom
2. Ship's library
3. Repair division
4. Supply department

1-30. Which of the following codes identifies the harder grade of pencil lead?

1. 9H
2. 5H
3. 2H
4. 6B

1-31. When using needle-in-tube pens, you produce different line widths by what means?

1. Bear down firmly on the pen head
2. Change the needle points
3. Draw double lines
4. Hold the pen at 90° to the drawing surface

1-32. What instrument is used to produce irregular curves?

1. A protractor
2. Multiple combination triangles
3. A set of French curves
4. An adjustable triangle

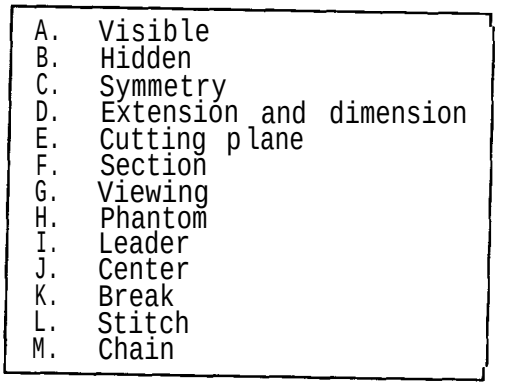


Figure 1C

IN ANSWERING QUESTIONS l-33 THROUGH 1-43, SELECT FROM FIGURE 1C THE TYPE OF LINE DESCRIBED IN THE QUESTION.

1-33. Lines used to indicate the part of a drawing to which a note refers.

1. B
2. C
3. I
4. J

1-34. Lines with alternating long and short dashes.

1. D
2. F
3. J
4. K

1-35. Lines used to shorten the view of long, uniform surfaces.

1. B
2. E
3. G
4. K

1-36. Lines used to indicate the surface in the section view imagined to have been cut along the cutting plane line.

1. E
2. F
3. G
4. H

1-37. Lines used to dimension an object.

1. A
2. B
3. C
4. D

1-38. Lines used to designate where an imaginary cutting took place.

1. E
2. F
3. G
4. H

1-39. Lines used to show surfaces, edges, or corners of an object that are hidden from sight.

1. A
2. B
3. C
4. D

1-40 Thick, alternating lines made of long and short dashes.

1. E
2. G
3. L
4. M

1-41. Lines that should stand out clearly in contrast to all other lines so that the shape of the object is apparent to the eye.

1. A
2. B
3. C
4. D

1-42. Lines used to indicate alternate and adjacent positions of moving parts, adjacent positions of related parts, and repetitive detail.

1. E
2. F
3. G
4. H

1-43. Lines used when drawing partial views of symmetrical parts.

1. C
2. D
3. E
4. F

1-44 Which of the following forms contains a curve that does not follow a constant arc?

1. Circle
2. Ellipse
3. Irregular curve
4. Ogee

1-45 Computer-aided drafting (CAD) helps a draftsman save considerable drawing time by which of the following means?

1. Its re-drawing capability
2. Its disk storage capability
3. Its lack of need for hand-held instruments
4. All of the above

1-46 Which of the following CAD components allows the draftsman to move from one command to another without the use of the function keys?

1. The plotter
2. The digitizer tablet
3. The printer
4. The computer program

1-47 Which of the following is a disadvantage of reproducing prints on a printer?

1. You cannot produce drawings on standard paper used for blueprints
2. You cannot do a quick review of the print at the design phase
3. You cannot copy complex graphic screen displays
4. You cannot get the quality from a printer that you can get from a pin plotter

1-48. What CAD component(s) produce(s) the drawing after it has been completed on the computer screen?

1. The plotter only
2. The digitizer only
3. The plotter and digitizer
4. The printer and digitizer

1-49. What is the main advantage of using numerical control machines rather than manually operated machines?

1. They can be used in mass production
2. They cost less to operate
3. They allow faster production
4. They can be operated by untrained machinists

1-50. Which of the following best describes direct numerical control (DNC)?

1. It allows the draftsman to program the computer to operate various machines used to produce the final print
2. It provides instructions that can be stored in a central computer memory, or on disk, for direct transfer to one or more machines that will make the part
3. It provides more rapid and precise manufacturing of parts
4. It acts as a central file where all drawings may be stored without having to store a large number of prints

1-51. What types of training are required to operate CAD and computer-aided manufacturing (CAM) systems?

1. Specialized and formal
2. Correspondence courses provided by the manufacturer of the system
3. Formal and on-the-job (OJT)
4. OJT and correspondence courses

1-52. Which of the following best describes the CAD/CAM systems used in manufacturing?

1. CAD draws the part and defines the tool path; CAM converts the tool path into codes the machine's computer understands
2. CAD controls the machine used to make the part; CAM is the drawing medium used to convert instructions to the machine making the part
3. CAD is the process in which all instructions are sent to the DNC operating stations; CAM is the receiving station that converts instructions from the CAD to the machine used to make the part
4. CAD uses the input from the engineer to relay design changes to the print; CAM receives those changes and converts them to codes used by the machine that makes the part

1-53. The view of an object is technically known by what term?

1. Projection
2. Extensions
3. Extenders
4. Parallelism

1-54. To visualize the object to be made from a blueprint, you should take what step first?

1. Look at the front view only
2. Interpret each line on the adjacent view
3. Study all views
4. Look at the top and side views only

1-55. Why are central projections seldom used?

1. They vary with the distance between the observer and the plane of projection
2. They vary with the distance between the observer and the object
3. They vary in size according to the relative positions of the object and the plane of projection
4. All of the above

1-56. Oblique and axonometric projections show which of the following dimensions?

1. Height and width only
2. Length only
3. Width only
4. Height, width, and length

1-57. Which of the following best describes an axonometric projection?

1. An orthographic projection in which the projectors are parallel to the object
2. A form of isometric projection in which the object is perpendicular to the viewing plane
3. A form of orthographic projection in which the projectors are perpendicular to the plane of projection and the object is angled to the plane of projection
4. A projection in which all views are drawn to the exact size and shape of the object

1-58. Conventional 3-view drawings are drawn by eliminating which of the following views from the third-angle orthographic projection?

1. Right side, bottom, and rear
2. Left side, top and bottom
3. Left side, rear, and top
4. Left side, bottom, and rear

1-59. Complex multiview drawings normally have how many views?

1. Two
2. Four
3. Six
4. Eight

1-60. When drawing a 3-view orthographic projection, the side and top views are drawn by extending lines in what direction(s)?

1. To the left and bottom of the front view
2. Horizontally to the right and vertically from the front view
3. From the bottom of the front view
4. Upward from the front view

1-61. Which of the following views shows the most characteristic features of an object?

1. Front
2. Top
3. Side
4. Bottom

1-62. What is the main purpose of a perspective drawing?

1. To show the object becoming proportionally smaller--a true picture of the object as the eyes see it
2. To show all views of the object in their true shape and size
3. To help the engineer design the object
4. To give the craftsman a clear picture to manufacture the part

1-63. Draftsmen use special views to give engineers and craftsmen a clear view of the object to be constructed.

1. True
2. False

A. Auxiliary view
B. Section view
C. Offset section
D. Half section
E. Revolved section
F. Removed section
G. Broken-out section
H. Aligned section
I. Exploded view

Figure 1D

IN ANSWERING QUESTIONS 1-64 THROUGH 1-74, CHOOSE FROM FIGURE 1D THE VIEW DESCRIBED IN THE QUESTION. SOME ANSWERS MAY BE USED MORE THAN ONCE.

1-64. A view that gives a clearer view of the interior or hidden features of an object that normally are not seen in other views.

1. A
2. B
3. C
4. D

1-65. A view that shows the true shape and size of the inclined face of an object.

1. A
2. B
3. C
4. D

1-66. A view that shows an object that is symmetrical in both outside and inside detail.

1. A
2. B
3. C
4. D

1-67. A view that shows the inner structure of a small area by peeling back or removing the outside surface.

1. F
2. G
3. H
4. I

1-68. A view that shows the relative locations of parts when you assemble an object.

1. F
2. G
3. H
4. I

1-69. A view that shows particular parts of an object.

1. F
2. G
3. H
4. I

1-70. A view that is used when the true sectional view might be misleading as with ribs and spokes.

1. F
2. G
3. H
4. I

1-71. A view that eliminates the need to draw extra views of rolled shapes, ribs, and similar forms.

1. E
2. F
3. G
4. H

1-72. A view that shows the cutting plane changing direction backward and forward to pass through features that are important to show.

1. A
2. B
3. C
4. D

1-73. A view that is made by visually cutting away a part of an object to show the shape and construction at the cutting plane and that is indicated by diagonal parallel lines.

1. A
2. B
3. C
4. D

1-74. A view that removes a portion of an object so the viewer can see inside.

1. A
2. B
3. C
4. D

1-75. A detail drawing has which of the following characteristics not found in a detail view?

1. It shows only part of the object.
2. It shows shape, exact size, finish, and tolerance for each part
3. It is drawn on the opposite plane of the detail view
4. It shows multiple components or parts

ASSIGNMENT 2

Textbook Assignment: "Machine Drawings" and "Piping Systems," chapters 4 and 5.

2-1. What method of indicating tolerance allows a variation from design specifications in one direction only?

1. Unilateral
2. Bilateral
3. Limited dimension
4. Minimum value

2-2. What letters of the alphabet may NOT be used in a datum reference?

1. A, C, D
2. F, I, O
3. I, O, P
4. I, O, Q

2-3. The permissible variation of a part is known as

1. limited dimensioning
2. tolerance
3. geometrical characteristic
4. a datum reference

2-4. View B of figure 4-1 in the textbook indicates what method of showing tolerance?

1. Limited dimensioning
2. Unilateral
3. Bilateral
4. Geometrical tolerance

2-5. Terms such as roundness, flatness, symmetry, and true position describe the geometrical characteristics of

1. surfaces
2. angles
3. reference points
4. a feature control frame

2-6. Fillets are used to prevent chipping and sharp edges.

1. True
2. False

IN ANSWERING QUESTIONS 2-7 THROUGH 2-12, SELECT FROM THE FOLLOWING LIST THE TERM THAT IS DESCRIBED IN THE QUESTION.

A. Fillets
B. Rounds
C. Slots and slides
D. Key
E. Keyway
F. Keyseat

2-7. A slot or groove on the outside of a part into which the key fits.

1. A
2. C
3. D
4. F

2-8. Specially shaped parts mated together but still movable.

1. A
2. B
3. C
4. D

2-9. An item placed in a groove or slot between a shaft and a hub to prevent slippage.

1. C
2. D
3. E
4. F

2-10. A slot or groove on the inside of a cylinder, tube, or pipe.

1. C
2. D
3. E
4. F

2-11. Items normally used to increase the strength of a metal corner and to reduce the possibility of a break.

1. A
2. B
3. C
4. D

2-12. Edges or outside corners machined to prevent chipping and to avoid sharp edges.

1. B
2. C
3. D
4. E

2-13. Classes of threads are different from each other in which of the following characteristics?

1. Specified tolerance and/or allowance
2. Minimum and maximum pitch
3. Major diameter only
4. Major diameter and root clearance

2-14 What part of a thread designator number identifies the nominal or outside diameter of a thread?

1. The first
2. The second
3. The fourth
4. The letter designator

2-15 Which of the following thread dimensions shows a 1/4-20 left-hand National course screw with a tolerance or fit of 2?

1. 1/4-20 UNC
2. 1/4-20-RH-UNC
3. 1/4-20 UNC-2 LH
4. 1/4-20

2-16 Which of the following National Form threads are most commonly used?

1. National course (NC) and pipe.
2. National fine (NF) and press fit
3. National fine (NF) and National course (NC)
4. Metric and National fine (NF)

IN ANSWERING QUESTIONS 2-17 THROUGH 2-22, REFER TO FIGURE 4-13 IN THE TEXTBOOK.

2-17. The thread on the outside of a bolt is an example of what type of thread?

1. A
2. B
3. C
4. D

2-18. The largest diameter of an external or internal thread is known by what term?

1. A
2. B
3. C
4. D

2-19. The center line that runs lengthwise through a screw is known by what term?

1. A
2. B
3. C
4. D

2-20. The surface of the thread that corresponds to the major diameter of an external thread and the minor diameter of an internal thread is known by what term?

1. B
2. C
3. D
4. E

2-21. The surface of the thread that corresponds to the minor diameter of an external thread and the major diameter of an internal thread is known by what term?

1. A
2. C
3. D
4. E

2-22. The distance from a point on a screw thread to a corresponding point on the next thread, measured parallel to the axis is known by what term?

1. B
2. D
3. E
4. F

2-23. The distance from the root of a thread to the crest, measured perpendicularly to the axis, is known by what term?

1. Lead
2. Pitch
3. Depth
4. Major diameter

2-24. What is the definition of the term "lead"?

1. The distance a screw thread advances on one turn, parallel to the axis
2. The distance the thread is cut from the crest to its root
3. The distance from the thread's pitch to its root dimension
4. The distance between external threads

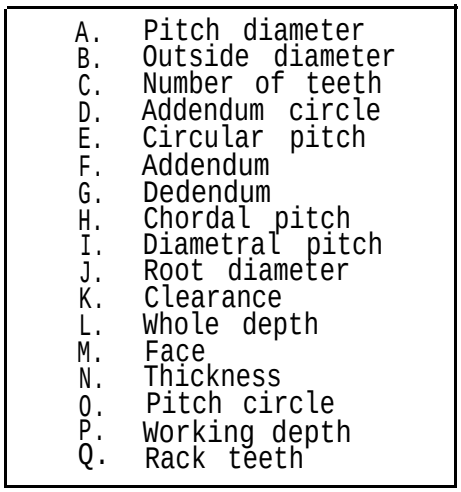


Figure 2A

IN ANSWERING QUESTIONS 2-25 THROUGH 2-41 SELECT FROM THE GEAR NOMENCLATURE IN FIGURE 2A THE TERM THAT IS DESCRIBED IN THE QUESTION.

2-25. The diameter of the pitch circle (or line) that equals the number of teeth on the gear divided by the diametral pitch.

1. A
2. B
3. C
4. D

2-26. The distance from center to center of teeth measured along a straight line or chord of the pitch circle.

1. F
2. G
3. H
4. I

2-27. The height of the tooth above the pitch circle or the radial distance between the pitch circle and the top of the tooth.

1. B
2. C
3. D
4. F

2-28. The circle over the tops of the teeth.

1. B
2. C
3. D
4. E

2-29. The number of teeth to each inch of the pitch diameter or the number of teeth on the gear divided by the pitch diameter.

1. I
2. J
3. K
4. L

2-30. The distance from top of the tooth to the bottom, including the clearance.

1. J
2. K
3. L
4. M

2-31. A gear that may be compared to a spur gear that has been straightened out.

1. M
2. O
3. P
4. Q

2-32. The working surface of the tooth over the pitch line.

1. L
2. M
3. N
4. O

2-33. The greatest depth to which a tooth of one gear extends into the tooth space of another gear.

1. N
2. O
3. P
4. Q

2-34. The diameter of the circle at the root of the teeth.

1. I
2. J
3. K
4. L

2-35 The distance between the bottom of a tooth and the top of a mating tooth.

1. H
2. I
3. J
4. K

2-36. The width of the tooth, taken as a chord of the pitch circle.

1. N
2. O
3. P
4. Q

2-37 The diameter of the addendum circle.

1. A
2. B
3. C
4. D

2-38 The length of the portion of the tooth from the pitch circle to the base of the tooth.

1. D
2. E
3. F
4. G

2-39. The circle having the pitch diameter.

1. N
2. O
3. P
4. Q

2-40. The diametral pitch multiplied by the diameter of the pitch circle.

1. A
2. B
3. C
4. D

2-41. The length of the arc of the pitch circle between the centers or corresponding points of adjacent teeth.

1. B
2. C
3. D
4. E

2-42. Helical springs are always identified by their classification and drawn to true shape.

1. True
2. False

2-43. Which of the following are three classifications of helical springs?

1. Contortion, extension, and compression
2. Extension, compression, and torsion
3. Combination extension and compression, torsion, and flex
4. Combination tension and compression, extension, and retracting

2-44. A number within the angle of a finish mark symbol provides what information?

1. The degree of finish
2. The roughness height in thousandths
3. The roughness height in one hundred thousandths
4. The ability to adhere to its mating part

2-45. When a part is to be finished all over, the finish mark is drawn on an extension line to the surface of the part to be machined.

1. True
2. False

2-46. The acceptable roughness of a part depends on which of the following requirements?

1. How the part will be used
2. The type of equipment used to make the finish
3. The method used to achieve the desired roughness
4. The designer's personal preference

2-47. What publication contains the standards for roughness?

1. MIL-STD. 46-1/C
2. ANSI 46.1-1962
3. NSTM 9730
4. MIL-STD 35-53

2-48. ANSI Y14.5M-1982 is the standard for all blueprints whether they are drawn by hand or on a computer.

1. True
2. False

2-49. Which of the following orthographic drawings are drawn on one plane only?

1. Mechanical
2. Single- and double-line pipe
3. Electrical
4. Electronic

2-50. A draftsman uses which of the following drawings to show the arrangement of pipes and fittings?

1. Double- and single-line orthographic
2. Single-line orthographic only
3. Single-line isometric
4. Double-line isometric

2-51. Which of the following types of drawings takes more time to draw and is used where visual presentation is more important than time?

1. Single-line orthographic
2. Double-line orthographic
3. Single-line isometric
4. Double-line isometric

2-52. What is the advantage of using single-line isometric drawings to lay out piping systems?

1. They take less time and show all information required
2. The information is of better graphic quality
3. They take less time and are shown on three planes of projection
4. They are cheaper to produce and easier to understand

2-53. A pipe connection is shown on a drawing by what means?

1. A break in the line
2. A general note specifying its location
3. A heavy dot and a note or specification to describe the type of connection
4. A leader line to the point of the connection and a note showing how the connection should be made

2-54. Detachable connections may be shown on a pipe drawing by which of the following means?

1. General notes
2. Specifications
3. A bill of material
4. All of the above

2-55. On a pipe drawing, one pipe is shown crossing in front of another by what means?

1. A heavy dot on the line represents one pipe passing in front of the other
2. The line representing the pipe farthest away has a break or interruption
3. The line representing the closest pipe has a break or interruption
4. The farthest line is drawn with a heavy, thick line

2-56. When an item is not covered by specific standards, what person or organization ensures that a suitable symbol is used?

1. The draftsman
2. The technician
3. The designer of the fitting
4. The responsible activity

2-57. When standard fittings are not used on a drawing, fittings such as tees, elbows, and crossings are shown by which of the following means?

1. Notes and specifications
2. Continuous lines
3. Circular symbols that show the direction of piping
4. Both 2 and 3 above

2-58. Piping system prints with more than one of the same piping systems are shown on a drawing by what means?

1. Additional letters added to the symbols
2. A print with several drawing numbers
3. A general note or specification
4. Heavier lines that differentiate between the systems

IN ANSWERING QUESTIONS 2-59 THROUGH 2-64, SELECT FROM THE FOLLOWING LIST THE COLOR ON THE PIPING SYSTEM THAT CARRIES THE MATERIAL IN THE QUESTION.

A. Yellow
B. Brown
C. Blue
D. Green
E. Gray
F. Red

2-59. Physically dangerous materials.

1. C
2. D
3. E
4. F

2-60 Toxic and poisonous materials.

1. A
2. B
3. C
4. D

2-61 Fire protection materials.

1. C
2. D
3. E
4. F

2-62. Anesthetics and harmful materials.

1. B
2. C
3. D
4. E

2-63. Flammable materials.

1. A
2. B
3. C
4. D

2-64. Oxidizing materials.

1. C
2. D
3. E
4. F

2-65. What is the hazard symbol for carbon dioxide?

1. FLAM
2. AAHM
3. TOXIC
4. PHDAN

2-66. Which of the following materials is not ordinarily dangerous in itself?

1. Trichloroethylene
2. Freon
3. Alcohol
4. Gasoline

2-67. Which of the following markings identifies materials that are extremely hazardous to life or health?

1. FLAM
2. TOXIC
3. AAHM
4. PHDAN

2-68. What publication lists standards for the marking of fluid lines in aircraft?

1. NSTM 3790
2. OPNAV 5100.1C
3. MIL-STD-1247C
4. NOSHA, Part 2

IN ANSWERING QUESTIONS 2-69 THROUGH 2-73, SELECT FROM THE FOLLOWING LIST THE TYPES OF HYDRAULIC LINES THAT ARE DESCRIBED IN THE QUESTION.

A. Supply lines
B. Pressure lines
C. Operating lines
D. Return lines
E. Vent lines

2-69. These lines carry only pressure from pumps to a pressure manifold, and on to various selector valves.

1. A
2. B
3. C
4. D

2-70. These lines carry excess fluid overboard or into another receptacle.

1. B
2. C
3. D
4. E

2-71. These lines alternately carry pressure to, and return fluid from, an actuating unit.

1. A
2. B
3. C
4. D

2-72. These lines carry fluid from the reservoir to the pumps.

1. A
2. B
3. C
4. D

2-73. Arrows printed on pipes show only the direction of fluid flow.

1. True
2. False

2-74. You will find standard piping symbols in what publication?

1. MIL-STD-17B, Parts 1 and 2
2. MIL-STD-14A
3. MIL-STD-35-35/2
4. MIL-STD-19B, Parts 1 and 2

2-75. In figure 5-23, assume the tee in the upper right corner has openings of A = 3 inches, C = 1 inch. You should read them in what order?

1. A, B, C
2. A, C, B
3. B, A, C
4. C, B, A

ASSIGNMENT 3

Textbook Assignment, "Electrical and Electronics Prints," chapter 6.

● QUESTIONS 3-1 THROUGH 3-45 DEAL WITH ELECTRICAL PRINTS.

IN ANSWERING QUESTIONS 3-1 THROUGH 3-6, SELECT FROM THE FOLLOWING LIST THE WIRING DIAGRAM DESCRIBED IN THE QUESTION.

A. Pictorial
B. Isometric
C. Schematic
D. Block
E. Single-line
F. Elementary

3-1. The outline of a ship or aircraft containing the general location of equipment.

1. A
2. B
3. C
4. D

3-2. Lines and graphic symbols that simplify complex circuits or systems.

1. C
2. D
3. E
4. F

3-3. Shows how each individual conductor is connected within the various connection boxes of an electrical circuit or system.

1. B
2. D
3. E
4. F

3-4. Made up of pictorial sketches of the various parts of an item of equipment and the electrical connections between the parts.

1. A
2. B
3. D
4. F

3-5. Graphic symbols that show how a circuit functions electrically.

1. A
2. C
3. D
4. E

3-6. Squares, rectangles, or other geometrical figures that represent major equipment components.

1. B
2. C
3. D
4. F

3-7. A series of consecutive numbers begins with the number 1 on a piece of equipment located in the lowest, foremost starboard compartment and continues on to similar pieces of equipment in the next compartment and so forth. This is a definition of what numbering term?

1. Form
2. Group
3. Type
4. Unit

3-8. When similar units are numbered within a compartment, what rule dictates the order of precedence?

1. Forward takes precedence over aft, port over starboard, and upper over lower
2. Lower takes precedence over upper, aft over forward, and starboard over port
3. Lower takes precedence over upper, forward over aft, and starboard over port
4. Lower takes precedence over forward, upper over aft, and port over starboard

3-9. A distribution panel is located on the second deck at frame 167 and is the first one on the port side of the compartment. It has what identification number?

1. 2-2-167
2. 167-2-1
3. 2-167-2
4. 2-l-167

3-10. The first number of a distribution panel provides what information about its location?

1. The horizontal position in relation to the center line
2. The vertical level by the deck or platform at which the unit is accessible
3. The vertical position in relation to the frame where it is located within the compartment
4. The horizontal and verticle location with relation to the center line

3-11. The identification number on a distribution panel provides what locations in its (a) second and (b) third positions

1. (a) Longitudinal, (b) transverse
2. (a) Deck, (b) frame
3. (a) Frame, (b) deck
4. (a) Deck, (b) platform

3-12. A ship that is divided into areas that coincide with fire zones prescribed by the ship's damage control plan has what type of numbering system?

1. Zone control
2. Fire control only
3. Damage control only
4. Both 2 and 3 above

3-13. In a zone control numbering system, the first and second digit on a switchboard number identifies the zone and the number of the switchboard within that zone.

1. True
2. False

3-14. Permanently installed shipboard electrical cables are identified by what means?

1. Numbers painted on the cable
2. Numbers painted on the bulkhead
3. Plastic tags
4. Metal tags

● QUESTIONS 3-15 THROUGH 3-22 DEAL WITH THE OLD SHIPBOARD CABLE TAG SYSTEM.

3-15. What color identifies a semivital cable?

1. Red
2. Gray
3. White
4. Yellow

3-16. What color identifies a vital cable?

1. Red
2. Gray
3. White
4. Yellow

3-17. The cable service letters FB identify a cable used for what purpose?

1. Interior communication
2. Battle power
3. Fire control
4. Sonar

IN ANSWERING QUESTIONS 3-18 THROUGH 3-22, REFER TO THE FOLLOWING CABLE TAG NUMBER.

1-FB-411-A1A

3-18. What numbers identify the main?

1. 1-FB
2. FB-411
3. 411-A1A
4. 1-FB-411

3-19. What numbers identify the submain?

1. 411
2. FB-411A
3. 1-FB-411A
4. 1-FB-411-A1

3-20. What numbers identify the branch?

1. FB-411
2. 1-FB
3. 1-FB-411
4. 1-FB-411-A1

3-21. What numbers identify a feeder?

1. FB
2. FB-411
3. 1-FB-411
4. 1-FB-411-A

3-22. What numbers identify a subbranch?

1. FB-411
2. 1-FB-411
3. 1-FB-411-A1
4. 1-FB-411-A1A

● QUESTIONS 3-23 THROUGH 3-28 DEAL WITH THE NEW SHIPBOARD CABLE TAG SYSTEM.

3-23 The new cable tag system numbers show which of the following parts in sequence?

1. Service, voltage, source
2. Voltage, service, source
3. Source, voltage, service
4. Source, service, voltage

3-24 The number 24 identifies what circuit voltage?

1. 2.4
2. 24
3. 240
4. 100 to 240

3-25. Cable voltages between 100 and 199 are identified by what means?

1. The letter A
2. The letter B
3. The number 1
4. The actual circuit voltage

3-26. When two or more generators service the same switchboard, the generators are marked by what means?

1. The first has the same number as the switchboard and the second will have that number followed by a letter
2. The first is marked with an A and the second with a B
3. They are numbered consecutively
4. Both have the switchboard number followed by consecutive numbers

3-27. On a cable marked with the number (1-143-3)-ZE-4P-A(2), the (2) provides what information about the cable?

1. Its location in the ship
2. Its location in the compartment
3. The section of the power main
4. The voltage in the circuit

3-28. In a three-phase ac system, a power cable with two conductors will be what colors for (a) B polarity and (b) C polarity?

1. (a) White, (b) black
2. (a) Black, (b) white
3. (a) Red, (b) black
4. (a) Red, (b) white

3-29. The symbols on an isometric wiring diagram that identify fixtures and fittings are found in what publication?

1. MIL-STD-15-2
2. Standard Electrical Symbol List, NAVSHIPS 0960-000-4000
3. ANSI Y32.7
4. Basic Military Requirements

3-30. A cable size of 9000 circular mils is identified in which of the following cable marking numbers?

1. (2-38-1)-L-A1-T-9
2. (3-12-9)-L-A1A-T-150
3. (9-124-4)-L-1A
4. (l-38-21-9

3-31. On an isometric wiring diagram, a single line represents cables with how many conductors?

1. One only
2. Two only
3. Three only
4. Any number

3-32. Which of the following plans shows the exact location of the cables aboard a ship?

1. Damage control plan
2. General plans
3. Wiring deck plan
4. Fire control plan

IN ANSWERING QUESTIONS 3-33 THROUGH 3-40, SELECT FROM THE FOLLOWING LIST THE DIAGRAM THAT IS DESCRIBED IN THE QUESTION.

A. Block diagram
B. Electrical system diagram
C. Elementary wiring diagram
D. Equipment wiring diagram
E. Isometric wiring diagram
F. Schematic diagram
G. Single-line diagram

3-33. Which diagram shows each conductor, terminal, and connection in the circuit?

1. A
2. B
3. C
4. D

3-34. Which diagram shows the ship's decks arranged in tiers?

1. A
2. C
3. E
4. F

3-35. Which diagram is used along with text material to show major units of the system in block form?

1. A
2. B
3. D
4. E

3-36. Which diagram is used to operate and maintain the various systems and components aboard ship?

1. A
2. B
3. E
4. G

3-37. Which diagram is illustrated in figure 6-3 in the textbook?

1. A
2. C
3. D
4. F

3-38. Which diagram shows the electrical operation of a particular piece of equipment, circuit, or system?

1. B
2. D
3. F
4. E

3-39. Which diagram shows the relative positions of various equipment components and the way individual conductors are connected in the circuit?

1. A
2. D
3. E
4. F

3-40. Which diagram shows a general description of a system and how it functions?

1. A
2. B
3. D
4. G

● QUESTIONS 3-41 THROUGH 3-45 DEAL WITH AIRCRAFT ELECTRICAL PRINTS.

3-41. All of the wiring in an aircraft is shown on which of the following prints?

1. A master wiring diagram
2. A master block diagram
3. A wiring plan
4. An isometric and schematic diagram

3-42. Equipment part numbers, wire numbers, and all terminal strips and plugs are shown in what type of wiring diagram?

1. Master
2. Circuit
3. Schematic
4. Isometric

3-43. In figure 6-7 in the textbook, the wire identification code shows what total number of identical units in the aircraft?

1. One
2. Two
3. Three
4. Four

3-44. A wire with the circuit function code 2RL 85F20N will be found in what circuit of an aircraft?

1. Radar
2. Engine control
3. Control surface
4. Radio

3-45. What is the wire number of an aircraft wire with the number 4SL 65F20N?

1. 4
2. 65
3. 20
4. 20N

● QUESTIONS 3-46 THROUGH 3-75 DEAL WITH ELECTRONICS PRINTS.

3-46. What types of electronics wiring diagrams show (a) the general location of electronics units, and (b) how individual cables are connected?

1. (a) Block, (b) isometric
2. (a) Isometric, (b) elementary
3. (a) Interconnection, (b) block
4. (a) Schematic, (b) elementary

3-47. A complete list of electronic cable designations may be found in what NAVSHIPS publication?

1. 0924-000-0140
2. 0945-001-1124
3. 0967-000-0140
4. 0932-101-1202

IN ANSWERING QUESTIONS 3-48 AND 3-49, SELECT FROM FIGURE 6-9 IN THE TEXTBOOK THE CIRCUIT OR SYSTEM DESIGNATION DESCRIBED IN THE QUESTION.

3-48. Aircraft early warning radar.

1. R-EA
2. R-EW
3. R-EZ
4. R-S

3-49. Height determining radar.

1. R-EF
2. R-EG
3. R-EW
4. R-EZ

3-50. A simplified block diagram is shown in which of the following figures in the textbook?

1. 6-10
2 6-11
3. 6-12
4. 6-13

3-51. On shipboard prints, what number or letter identifies the circuit differentiating portion of cable marking 2R-ET-3?

1. R
2. 2
3. 3
4. E

3-52. Block diagrams describe the functional operation of electronics systems in a different manner than they do in electrical systems.

1. True
2. False

3-53. Which of the following diagrams may be used to troubleshoot as well as identify function operations?

1. Detailed schematic block
2. Servicing block
3. Functional block
4. Both 2 and 3 above

3-54. Individual circuits and parts may be checked more easily by using which of the following diagrams?

1. Detailed schematic block
2. Servicing block
3. Schematic
4. Isometric

3-55. In detailed schematic diagrams, signal flow is shown moving in what direction?

1. Top to bottom
2. Right to left
3. Left to right
4. Bottom to top

3-56. In a wiring circuit diagram, grounds, grounded elements, and returns are identified by what color?

1. Orange
2. Brown
3. Black
4. Violet

3-57. The reference designations currently used to identify parts in electronic drawings are part of the block numbering system.

1. True
2. False

3-58. A system is defined as two or more sets and other assemblies, sub-assemblies, and parts necessary to perform an operational function in what numbering system?

1. Block
2. Reference
3. Unit
4. Group

3-59. What is the highest level in the assignment of reference designations for the current electronics designation system?

1. Set
2. Unit
3. Part
4. Assembly

3-60. Identify the following resister with the reference designation 2A11A4A1R3.

1. No. 3 resistor on No. 1 card of rack 4 in assembly 11 of unit 2
2. No. 3 resistor on No. 2 card of rack 4 in assembly 11 of unit 1
3. No. 1 resistor on No. 2 card of rack 3 in assembly 11 of unit 1
4. No. 1 resistor on No. 3 card of rack 2 in assembly 11 of unit 4

3-61. The spaghetti tags on the ends of a conductor provide what information?

1. The terminal board and terminal to which the marked end is connected
2. The abbreviated reference designation number
3. The terminal board and terminal to which the opposite end is connected
4. The complete reference designation number

3-62. A block diagram of a complicated aircraft system that contains details of signal paths, wave shapes, and so on is commonly known by what term?

1. Schematic diagram
2. Signal flow diagram
3. Flow path indicator
4. Reference chart

3-63. Aircraft electronic wiring diagrams fall into which of the following classes?

1. Diagnostic
2. Chassis
3. Interconnnecting
4. Both 2 and 3 above

3-64. What part of the aircraft electronics wire identification code designates the terminal connection?

1. First
2. Second
3. Third
4. Fourth

3-65. Drawings that are broken down and simplified both mechanically and electronically are known by what term?

1. Electromechanical drawings
2. Detailed electronic/mechanical drawings
3. Simplified electronic and mechanical drawings
4. Electronic and mechanical isometric drawings

● QUESTIONS 3-66 THROUGH 3-75 DEAL WITH COMPUTER LOGIC.

3-66. The operations of digital computers are expressed in

1. arithmetical expressions
2. algebraic equations
3. verbal reasoning
4. symbolic logic

3-67 Boolean algebra uses what three basic logic operations?

1. AND, OR, and NAND
2. NAND, INHIBIT, and NOR
3. AND, OR, and NOT
4. OR, NAND, and NOR

3-68 Boolean algebra is based upon elements having how many possible stable states?

1. Two
2. Four
3. As many as there are terms in an expression
4. An infinite number

3-69 What is the Boolean algebra expression for the OR operation?

1. AB
2. A
3. +
4. ●

IN ANSWERING QUESTIONS 3-70 THROUGH 3-73 SELECT FROM THE FOLLOWING LIST THE LOGIC OPERATION DESCRIBED IN THE QUESTION.

A. AND
B. OR
C. NOT
D. NOR
E. NAND
F. INHIBIT
G. EXCLUSIVE OR

3-70. Every input line must have a signal to produce an output.

1. A
2. C
3. D
4. F

3-71. A combination of an OR operation and a NOT operation.

1. A
2. C
3. D
4. E

3-72. An input signal produces no output, while a no-signal input state produces an output signal.

1. B
2. C
3. F
4. G

3-73. When a signal is present at every input terminal, no output is produced.

1. D
2. E
3. F
4. G

3-74. Basic logic diagrams have what purpose in computer logic?

1. To express the operation being used
2. To identify the algebraic expression
3. To show the operation of the unit or component
4. To troubleshoot and maintain the system

3-75. Detailed logic diagrams provide which of the following information?

1. All logic functions of the equipment
2. Socket locations
3. Test points for troubleshooting
4. All of the above

ASSIGNMENT 4

Textbook Assignment: "Structural and Architectural Drawings" and "Developments and Intersections," chapters 7 and 8.

● QUESTIONS 4-1 THROUGH 4-19 DEAL WITH STRUCTURAL SHAPES AND MEMBERS.

4-1. A building project is divided into what phases?

1. Design and production
2. Design and construction
3. Design, presentation, and construction
4. Presentation, construction, and approval

4-2. The structural load a proposed building will carry is decided by which of the following persons?

1. The draftsman
2. The engineer
3. The architect
4. Both 2 and 3 above

4-3. You can find information on structural shapes and symbols in which of the following publications?

1. ANSI 14.5/2 1982
2. MIL-STD-18B, part 4
3. American Society of Construction Engineers
4. Both 2 and 3 above

4-4. The dimension of the widest leg is always given first in the designation of what shape?

1. Channel
2. Angle
3. Tee
4. Tie rod

4-5. A zee shape that is 4 inches in depth, has a 3 1/2-inch flange, and weighs 10.2 lbs. per linear foot is described in which of the following dimensions?

1. Z 4 x 3 1/2 x 10.2
2. S 10.2 x 3 1/2 x 4
3. W 3 1/2 x 4 x 10.2
4. Z 3 1/2 x 4 x 10.2

4-6 Channel shapes are most commonly used in areas that require which of the following characteristics?

1. Additional strength
2. Built-up members
3. Reinforcement
4. A single flat face without outstanding flanges

4-7. An I beam shape with a dimension of 17 I 40.5 has what nominal depth?

1. 40.5
2. 57.5
3. 17
4. 17.5

4-8. Tie rod and pipe columns are designated by what measurement(s)?

1. Thickness
2. Outside diameter
3. Inside diameter
4. Thickness and outside diameter

4-9. The total weight of all people and movable objects that a structure supports at any one time is what type of load?

1. Dead
2. Live
3. Cumulative
4. Transfer

4-10. The total load supported by a structural member at a particular instant is equal to what two types of loads?

1. Transfer and cumulative
2. Transfer and live
3. Cumulative and dead
4. Dead and live

4-11. The soil bearing capacity is greatest when a structure has a wide foundation or footing.

1. True
2. False

A. Beam	H. Pillar
B. Cantilever	I. Rafter plate
C. Column	J. Sill
D. Girder	K. Sole plate
E. Girt	L. Stud
F. Lintel	M. Top plate
G. Pier	N. Truss

Figure 4A

IN ANSWERING QUESTIONS 4-12 THROUGH 4-19, CHOOSE FROM FIGURE 4A THE STRUCTURAL MEMBER DESCRIBED IN THE QUESTION. SOME CHOICES MAY NOT BE USED.

4-12 A horizontal load-bearing structure that spans a space and is supported at both ends.

1. A
2. B
3. D
4. M

4-13. Usually rests directly on footings.

1. C and H
2. E and F
3. H and K
4. J and L

4-14. The chief vertical structural member used in the construction of lightweight buildings.

1. C
2. E
3. G
4. L

4-15. Supports the ends of floor beams or joists in wood-frame construction.

1. D, E, and J
2. E, H, and L
3. F and G
4. H and J

4-16. A member that is fixed at one end.

1. A
2. B
3. D
4. I

4-17. Support the wall ends of rafters.

1. A and D
2. G and H
3. I and M
4. K and L

4-18. May rest directly on a footing, or may be set or driven into the ground.

1. C
2. G
3. H
4. L

4-19. Two horizontal members joined together by a number of vertical and/or inclined members.

1. B
2. D
3. L
4. N

4-20. The process of riveting steel structures has been replaced by welding because of its greater strength and reduction of stress applied to the connection.

1. True
2. False

● IN ANSWERING QUESTIONS 4-21 THROUGH 4-24, REFER TO THE WELD SYMBOL ELEMENTS IN FIGURE 7-4 IN THE TEXTBOOK.

4-21. What element shows the specification, process, or other reference as to the type of fabrication?

1. 5
2. 6
3. 7
4. 8

4-22. In part 6, the letter G provides what information about the weld?

1. It will be finished by filing
2. It will be finished by grinding
3. It is double welded and ground
4. It requires a 2-4 finish

4-23. In part 4, the symbols "1/2" and "2-4" show that the weld should be (a) how thick, (b) how long, and (c) have how much pitch?

1. (a) 2 inches, (b) 1/2 inch, (c) 4 inches
2. (a) 1/2 inch, (b) 4 inches, (c) 2 inches
3. (a) 4 inches, (b) 1/2 inch, (c) 2 inches
4. (a) 1/2 inch, (b) 2 inches, (c) 4 inches

4-24. In part 2, the arrow provides what information about the weld?

1. Location
2. Direction
3. Type
4. Degree of finish

4-25. When steel structures will be riveted, the rivet holes are always drilled during which of the following steps?

1. Fabrication
2. Assembly on site
3. Both 1 and 2 above
4. Erection

4-26. What field riveting symbol shows that the rivet should be countersunk on both sides?

1. 
2. 
3. 
4. 

4-27. The shop riveting symbol  shows that the rivet should be installed in what way?

1. Countersunk and chipped on the near side
2. Countersunk and chipped on both sides
3. Countersunk and chipped on the far side
4. Riveted with two full heads

4-28. What shop riveting symbol shows that the rivet should be countersunk and not over 1/8 inch high on the far side?

1. 
2. 
3. 
4. 

IN ANSWERING QUESTIONS 4-29 THROUGH 4-33, SELECT FROM THE FOLLOWING LIST THE TYPE OF DRAWING DESCRIBED IN THE QUESTION.

A. Layout
B. General
C. Fabrication
D. Erection
E. Falsework

4-29. These drawings show where temporary supports will be used in the erection of difficult structures.

1. B
2. C
3. D
4. E

4-30. The number of these drawings needed depends on the size and nature of the structure and the complexity of the operation.

1. A
2. B
3. C
4. D

4-31. These drawings provide information on the location, alignment, and elevation of the structure and principle parts in relation to the ground at the site.

1. A
2. B
3. C
4. D

4-32. These drawings contain necessary information on the size, shape, material, and provisions for connections and attachments for each member.

1. B
2. C
3. D
4. E

4-33. These drawings show the location of the various members in the finished structure.

1. B
2. C
3. D
4. E

4-34 Contours, boundaries, roads, utilities, trees, structures, and other physical features of a site are shown in what type of construction plan?

1. Framing
2. Floor
3. Plot
4. Site

4-35 What type of construction drawing shows plans and elevations on a small scale?

1. Plot
2. General
3. Detail
4. Site

● IN ANSWERING QUESTIONS 4-36 AND 4-37, REFER TO THE FOUNDATION PLAN IN FIGURE 7-9 IN THE TEXTBOOK.

4-36. The main foundation consists of what material(s)?

1. An 8-inch block wall on a 10-inch footing
2. An 8-inch block wall on a 12-inch footing
3. A 10-inch block wall on an 18-inch footing
4. A 10-inch block wall on an 18-inch footing

4-37. What are the dimensions of the piers?

1. 10 x 16 inches
2. 12 x 12 inches
3. 14 x 16 x 18 inches
4. 14 x 18 x 20 inches

4-38. The length, thickness, and character of walls on one floor are shown in what type of plan?

1. Foundation
2. Floor
3. Framing
4. Plot

4-39. The dimensions and arrangements of wood structural members are shown in what type of plan?

1. Floor
2. Plot
3. Utility
4. Framing

4-40. Information on studs, corner posts, bracing, sills, and plates is provided in what type of plan?

1. Floor
2. Plot
3. Utility
4. Framing

4-41. A builder decides where to leave openings for heating, electrical, and plumbing systems by using what type of plan?

1. Framing
2. Plot
3. Utility
4. Floor

4-42. An elevation drawing shows which of the following views?

1. A horizontal view of the foundation
2. A vertical view of doors and windows
3. A two-dimensional view of roof framing
4. A three-dimensional view of the location of utilities

4-43. When general plans of a given area such as a wall section contain insufficient information, the craftsman relies on what type of drawing?

1. Specification
2. Detail
3. Elevation
4. Sectional

4-44. When a craftsman finds a discrepancy between the drawings and specifications, the drawings take precedence.

1. True
2. False

4-45. What is the meaning of the term "sheet metal development?"

1. A three-dimensional object is formed on a flat piece of sheet metal
2. A three-dimensional object is unrolled or unfolded onto a flat plane through the medium of drawn lines
3. A pictorial drawing of an object is made from sheet metal in its true dimensions
4. A three-view orthographic projection is made on sheet metal

4-46. In figure 8-1 of the text, view A shows what type of bend used on sheet metal?

1. A joint
2. A seam
3. An edge
4. A rolled joint

4-47. Which of the following seams is the least difficult to make?

1. A flat lock seam
2. A lap seam
3. A cap strip connection
4. An S-hook slip joint

4-48. In bending sheet metal, the bend allowance is computed along what part of the bend?

1. The neutral line
2. The outside of the sheet metal as it is being stretched
3. The inside of the sheet metal as it is being compressed
4. The flat

A.	Base measurement
B.	Bend allowance
C.	Bend tangent line
D.	Flange
E.	Flat
F.	Leg
G.	Mold line
H.	Radius
I.	Setback

Figure 4B

IN ANSWERING QUESTIONS 4-49 THROUGH 4-53, CHOOSE FROM THE METAL BENDING TERMS IN FIGURE 4B THE TERM DESCRIBED IN THE QUESTION. Some choices may not be used.

4-49. The outside diameter of the formed part.

1. A
2. C
3. D
4. E

4-50. The amount of metal used to make a bend.

1. A
2. B
3. C
4. D

4-51. A line formed by extending the outside surfaces of the leg and flange so they intersect?

1. B
2. C
3. G
4. H

4-52. The distance from the bend tangent line to the mold point.

1. C
2. D
3. G
4. I

4-53. The shorter part of a formed angle.

1. B
2. D
3. E
4. F

4-54. A surface is said to be developable if a thin sheet of flexible material can be wrapped smoothly about its surface.

1. True
2. False

4-55. What type of development refers to an object that has surfaces on a flat plane of projection?

1. Radial line
2. Straight line
3. Right pyramid
4. Oblique pyramid

4-56. In figure 8-9, part B, in the textbook, line E-l is the true length of what line(s)?

1. A-l
2. B-2 and D-4
3. C-3
4. 0-1 and 02

4-57. What type of pyramid has lateral edges of unequal length?

1. Right
2. Oblique
3. Orthographic
4. Isometric

4-58. In figure 8-11, view D, in the textbook, the true length of the truncated pyramid is represented by the point between what lines?

1. M-N
2. M-O
3. N-P
4. Y-Z

● QUESTIONS 4-59 THOUGH 4-61 DEAL WITH PARALLEL-LINE DEVELOPMENT AND FIGURES 8-12 AND 8-13 IN THE TEXTBOOK.

4-59 In figure 8-12, view A, the width of the cylinder is equal to what other of its measurements?

1. Height
2. Length
3. Height plus the seam allowance
4. Circumference

4-60 It is normal practice to place seams on the shortest side in sheet metal development. Which of the following forms is an exception?

1. Cylinder
2. Pyramid
3. Cone
4. Elbow

4-61. In figure 8-12, view B, points of intersection are established on the development for what purpose?

1. To determine its true length
2. To give it a curved shape
3. To determine its actual size
4. To ensure greater accuracy.

● QUESTIONS 4-62 THROUGH 4-69 DEAL WITH RADIAL-LINE DEVELOPMENT OF CONICAL SURFACES.

4-62. What two dimensions are necessary to construct a radial-line development of a conical surface?

1. The true length of the right angle and the diameter of its base
2. The slant height of the cone and the diameter of the base
3. The slant height of the cone and the circumference of the base
4. The true length of the slant height of the cone and the angle of the cone

4-63. The size of the sector is determined by what dimensions?

1. The radius of the circle
2. The height of the cone
3. The sector minus the height of the cone
4. The proportion of the height to the base diameter

4-64. When developing a regular cone, the element lines can be seen in their true length only under which of the following conditions?

1. The viewer is looking at them at right angles
2. The development is completed
3. A base line is established
4. There is a projection to an auxiliary view

4-65. If a regular cone is truncated at an angle to the base, the inside shape on the development no longer has a constant radius.

1. True
2. False

4-66. When developing a regular cone, the true length settings for each element are taken from what view(s)?

1. Top
2. Side
3. Front only
4. Front and side

4-67. When the development of the sloping surface of a truncated cone is required, what view shows its true shape?

1. Orthographic
2. Auxiliary
3. Detail
4. Isometric

4-68. Oblique cones are generally developed by using what method?

1. Straight-line development
2. Radial-line development
3. Triangulation
4. Approximation

4-69. On an oblique cone, you should draw a true length diagram adjacent to the front view under which of the following circumstances?

1. When it is necessary to find the true length of several edges or elements
2. When directed by notes and specifications
3. When drawing radial-line developments
4. When drawing straight-line developments

● QUESTIONS 4-70 THROUGH 4-73 DEAL WITH TRANSITION PIECES.

4-70. Nondevelopable surfaces require what type of development?

1. Straight line
2. Radial line
3. Triangulation
4. Approximation

4-71. When a surface is developed from a series of triangular pieces laid side-by-side, the procedure is known by what term?

1. Transitioning
2. Approximation
3. Paralleling
4. Triangulation

4-72. To develop a square-to-round transition piece, you should take what step first?

1. Draw a true length diagram
2. Draw the front view
3. Draw the top and side views
4. Develop the square piece

4-73. Rectangular-to-round transition pieces are developed in the same manner as square-to-round with which of the following exceptions?

1. All of the elements are centered on the same axis
2. The rectangular-to-round requires auxiliary views
3. All the elements are drawn to their true lengths
4. All the elements are of different lengths

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